

**Missouri Department of Natural Resources
Water Pollution Control Program**

Total Maximum Daily Loads (TMDLs)

for

**Rush Creek
Platte County, Missouri**

**Completed July 22, 1999
Approved December 1, 1999**

Rush Creek (Platte County, Missouri) Final TMDL (Total Maximum Daily Load) for BOD/NFR (Objectionable Bottom Deposits)

Name: Rush Creek

Missouri WBID No.: 0278

Missouri Class: P (Standing water reaches of Class P streams, Class P streams maintain permanent flow even in drought).

Designated uses: Livestock & Wildlife Watering, Protection of Warm Water Aquatic Life and Human Health - Fish Consumption.

Size of Impaired Segment: 0.2 miles

Location of Impaired Segment: NW $\frac{1}{4}$ S-27, T-51N, R-34W

Pollutant: BOD/NFR (Objectionable Bottom Deposits)

Pollutant Source: Platte County Sewer District, El Dorado Apartments wastewater discharge. (The facility is a 0.15 MGD contact stabilization WWTP located in the NW $\frac{1}{4}$ NW $\frac{1}{4}$ S-27, T-51N, R-34W)

TMDL Priority: High

1. Description of Waterbody, Pollutant of Concern, Pollutant Sources and Priority Ranking

Rush Creek is listed on the 1998 303(d) as Rush Creek, Missouri WBID No. 0278. The pollutant is objectionable bottom deposits of non-filterable residues resulting from discharges from the Platte County Sewer District #7. The priority ranking for Rush Creek is high.

The pollutant source is the El Dorado Apartments wastewater discharge. Like many other small mechanical wastewater treatment plants, this facility had chronic problems with poor effluent quality. The pollutant listed on the 303(d) list was "BOD/NFR" (Biological Oxygen Demand/Non-Filterable Residue). This is a general term used by Missouri DNR to denote impacts from a domestic wastewater discharge. There is no in-stream data for this section of Rush Creek on BOD, NFR or dissolved oxygen levels. The stream was judged to be impaired based on observations during four visual and qualitative invertebrate benthic surveys conducted between 1986 and 1996. The first of these surveys indicated the presence of excessive amounts of benthic algae in the stream and the latter

three surveys noted sludge deposits that were felt to exceed state narrative criteria for unsightly or harmful bottom deposits.

As described in the Implementation Plan, below, the El Dorado Apartment WWTP discharge was the source of the pollutant, and this facility was closed and all the sewers were connected to the regional WWTP. Since the last stream assessment was prior to the elimination of this WWTP, this segment appears on the 1998 Section 303(d) list, and the listing requires this TMDL to be developed.

2. Description of the Applicable Water Quality Standards and Numeric Water Quality Target

The applicable standard is a narrative water quality standard. Missouri State Water Quality Standards, 10 CSR 20-7.031(3)(A), states “Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses.” Thus, the pollutant of concern that has been documented is “unsightly or harmful bottom deposits”, which by convention Missouri lists as “BOD/NFR”.

The designated uses for Rush Creek are Livestock & Wildlife Watering, Protection of Warm Water Aquatic Life and Human Health - Fish Consumption 10 CSR 20-7 Table H. The designated use that is impaired in Rush Creek is the Aquatic Life use.

Missouri’s water quality standards include the EPA “three-tiered” approach to anti-degradation. Tier I defines baseline conditions for all waters -- it requires that existing beneficial uses are protected. TMDLs would normally be based on this tier, assuring that numeric criteria (such as dissolved oxygen, ammonia) are met to protect uses. Tier II requires no degradation of high-quality waters, unless limited lowering of quality is shown to be necessary for “economic and social development”. A clear implementation policy for this tier has not been developed, although if sufficient data on high-quality waters are available, TMDLs could be based on maintaining existing conditions, rather than the minimal tier I criteria. Tier III (the most stringent tier) applies to waters designated in the water quality standards as outstanding state and national resource waters; tier III requires no degradation under any conditions. Management may require no discharge or prohibit certain polluting activities. TMDLs would need to assure no measurable increase in pollutant loading. This TMDL satisfies tier I of Missouri's anti-degradation policy, since after this TMDL has been implemented, water quality in the impaired segment will be improved and meet the applicable standards, and the beneficial uses will be protected.

Since the applicable standard is narrative, a quantitative value used to measure whether or not the applicable water quality standard is attained is developed here. The relationship between suspended solids in the water column and deposited solids on the streambed is greatly confounded by stream morphometry and the variable nature of stream flow. Thus, the concept of a quantifiable “load” per unit of time and water volume does not translate well into problems involving deposited solids. Missouri DNR’s standard operating procedure for conducting rapid visual and qualitative benthic examination of streams defines exceedence of narrative criteria for objectionable bottom deposits as “noticeable deposits that persist for at least 100 yards.” This definition of exceedence may be restated in terms of attaining standards as follows: the narrative standard for objectionable bottom deposits are met if the noticeable objectionable bottom deposits persist for 99 yards or less.

3. Loading Capacity – Linking Water Quality and Pollutant Sources

Loading is usually expressed in mass units, such as pounds per day. In this case, the applicable narrative standard is not easily interpreted using mass units. Based on Missouri DNR's standard operating procedure for conducting rapid visual and qualitative benthic examination of streams which defines attainment of narrative criteria for objectionable bottom deposits as "noticeable deposits that persist for 99 yards or less", the load capacity for Rush Creek is "noticeable sludge deposits persisting for 99 yards of the stream." The target for this TMDL is based on the interpretation of the applicable narrative criteria, and this interpretation is expressed in terms of the length of the deposit in the stream.

As mentioned above, there is no instream data for this segment, and, the El Dorado Apartments WWTP has been closed and all sewers attached to the regional WWTP, which does not discharge into Rush Creek. The WWTP was closed because it was visually obvious at the time that the El Dorado Apartments WWTP was the source of the objectionable bottom deposits and that the WWTP should be closed to solve the water quality problem. Since there is no water sampling data, a quantitative link between the TSS (total suspended solids) load or other measure from the El Dorado Apartments WWTP and the measured distance of objectionable bottom deposits can not be made for this TMDL, which could be used to arrive at a Waste Load Allocation in mass units for use in an NPDES permit. Since the WWTP is closed and the NPDES permit will be terminated, a loading capacity in mass units is not needed in this TMDL, although it may be needed in a future TMDL involving bottom deposits. Since the waste load allocation is being held in reserve for future point sources (see below), the linkage between the pollutant source and the instream water quality will be made at the time the future point source(s) are considered. In addition if NPDES permits are part of some future implementation, then the loading capacity will be translated into mass units so that it may be used to arrive at a WLA for use in the permit.

Summarizing, the loading capacity of the segment is "noticeable objectionable bottom deposits that persist for 99 yards of the stream."

4. Load Allocations

Nonpoint source loads contributing to the deposited solids problems in Rush Creek have not been observed. As was noted above, no objectionable bottom deposits were observed upstream of the El Dorado Apartments discharge, and thus the present indication is that nonpoint sources are not contributing to the problem. However, Missouri chooses to allocate 10% of the total load capacity as reserve for present or future nonpoint sources. The load allocation is 9.9 yards of noticeable sludge deposits.

5. Wasteload Allocation

There are two small wastewater discharges to Rush Creek upstream of the affected segment in addition to the El Dorado Apartments WWTP. These are a septic tank and aerated lagoon serving the Shelter Haven facility and a septic tank serving the Hampton Woods subdivision. Stream surveys have indicated there are no noticeable solids deposits immediately upstream of the El Dorado Apartments outfall, so that none of the observed solids deposition is contributed from these two facilities. Missouri chooses that this TMDL establishes that 80% of the load capacity could be given to the El Dorado Apartments discharge and the other two upstream dischargers, however, since the El Dorado Apartments discharge is being closed and the other upstream sources do not contribute to the load, this 80% of the waste load capacity allocation is reserved for future point source discharges. The waste load allocation is 79.2 yards of noticeable sludge deposits.

Because there is no data (other than visual observation of objectionable bottom deposits) and there is no possibility to collect data (since the WWTP is now closed), it is impossible in this TMDL to correlate the noticeable bottom deposits with a measurable pollutant measured in mass units discharged from this WWTP. Therefore, it is impossible in this TMDL to determine what reduction in pollutant load in terms of mass of a pollutant is necessary to meet the applicable water quality standards. However, since the Wasteload Allocation is reserved for future point source discharges, this information will be gathered and evaluated at some future time when the future point source(s) are being considered.

6. Margin of Safety

The El Dorado Apartments WWTP was closed and all sewers were attached to the regional WWTP. As a result, there is now zero discharge into Rush Creek from this facility, and there is no uncertainty that water quality standards will be met as a result of the closure of this facility. There is insufficient data and other information available to quantitatively determine the uncertainty in the relationship between the load and wasteload allocations reserved for future growth and the water quality. Therefore, a margin of safety of 10% of the loading capacity is established in this TMDL. The margin of safety of the numeric target is 9.9 yards of objectionable bottom deposits. As mentioned in the implementation plan for this TMDL, this TMDL will be reopened if it is determined that water quality standards are not met after implementation. If this TMDL is reopened, the margin of safety will be re-evaluated. Furthermore, the margin of safety will also be evaluated for any future point sources that are considered.

7. Seasonal variation

Shadin¹ calculated the coefficient of friction of water and reported these values: 0.2_ C: 0.01858, 10.8_ C: 0.01317, 20_ C: 0.01102 and 30_ C: 0.00800. Thus, suspended sediments sink twice as fast at 23C than at 0C. This would tend to make solids deposition more problematic in summer than in winter. However, since streamflow and stream velocity are largely independent of season, these two variables would have a much greater effect on deposition. Since the standards exceedences were not observably correlated with seasons and there is no other evidence to link the observed impairment with the seasons, seasonality is not considered to be important in this TMDL.

8. Monitoring Plan for TMDLs Developed Under the Phased Approach

The Kansas City Regional Office of Missouri DNR will check the plant site at six-month intervals to determine when final closure of the site is complete. DNR WPCP will do a stream survey of Rush Creek in the vicinity of the El Dorado Apartments WWTP within two years of plant closure, and will determine at that time whether applicable water quality standards are met.

9. Implementation Plans

This TMDL will be incorporated into Missouri's Water Quality Management Plan. For several years DNR has urged the closing of the El Dorado Apartments WWTP and connection of its sewers to a regional WWTP. A DNR inspection of the facility in February 1999, noted that this facility has been closed and all its sewers have been connected to the Brush Creek regional WWTP. DNR will require the complete closure of the site, which will include discharge of any wastewater/rainwater remaining at the plant to the Brush Creek sewers, removal of all plant components, grading and re-vegetation of the plant site. At that time the NPDES permit will be terminated. After a stream survey conducted by DNR is completed, DNR will assess whether applicable water quality standards are met. If standards are met, then DNR will delist Rush Creek for objectionable bottom deposits. If applicable standards are not met, then DNR will reopen this TMDL and revise it appropriately to meet all applicable statutes and regulations.

10. Reasonable Assurances

Until the plant site is closed to Missouri DNR's satisfaction, the facility remains under the authority of the NPDES permit program. DNR has adequate authority to insure the proper closure of this facility.

11. Public Participation

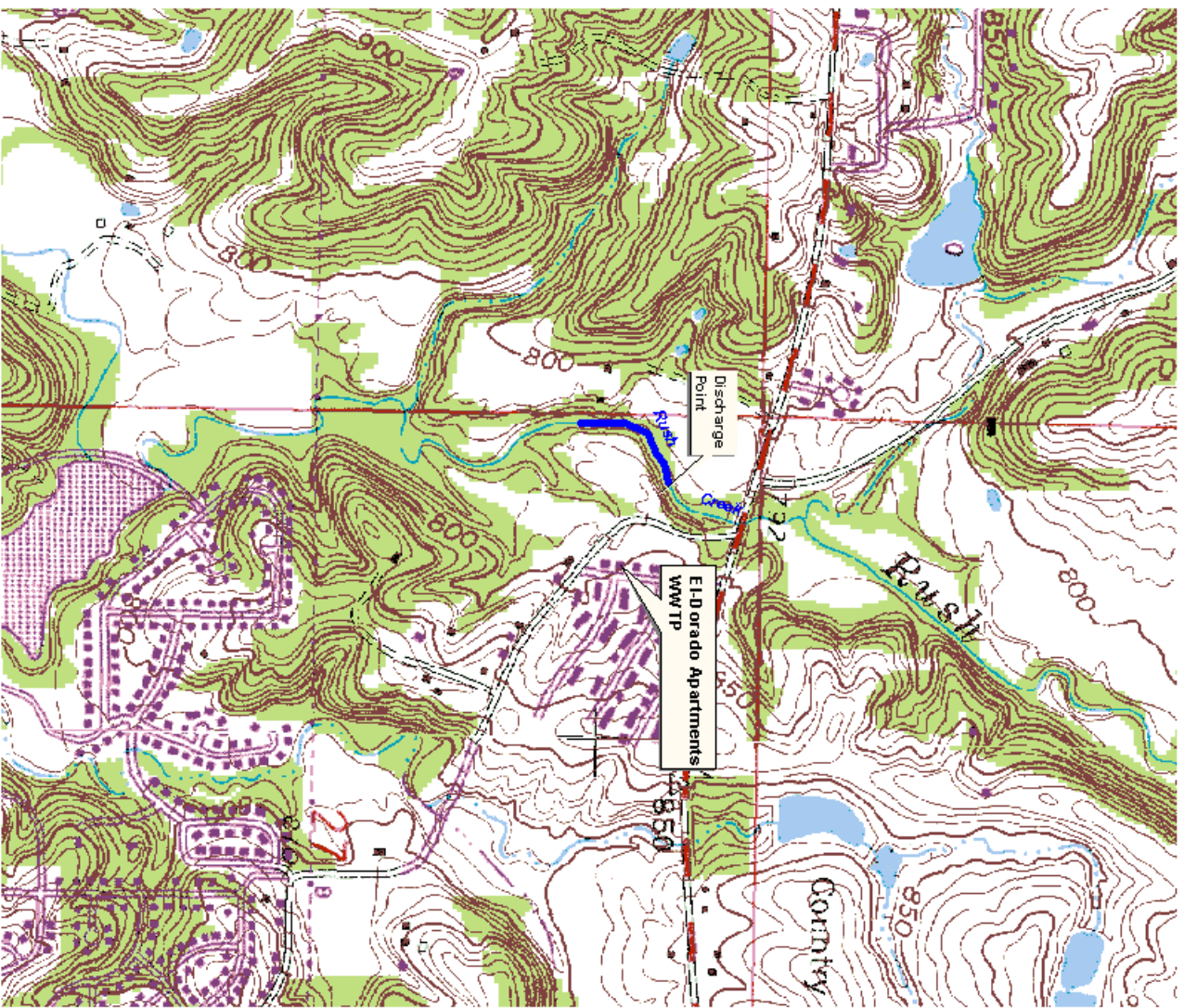
The Missouri Department of Natural Resources, Division of Environmental Quality, Water Pollution Control Program, developed this TMDL. The TMDL was placed on public notice by DNR from May 28, 1999 to July 2, 1999. No comments were received. This TMDL was first provided to EPA on

¹ Shadin, V.I. 1956. Life in Rivers (Russian). *Jizni presnih vod S.S.S.R.* 3. Reproduced in *The Ecology of Running Waters*, Hynes, HBN.1972. p30. Univ. of Toronto Press

June 16, 1999. DNR has conducted 6 public meeting in 1999 on TMDL and 303(d) listing issues, and no comments were received on this Rush Creek TMDL.

12. Administrative Record

An Administrative Record for this TMDL is being maintained by the Missouri DNR.



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TMDL: BOD/NFR

